

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1. (original) An improved p-type gallium nitride-based semiconductor device comprising:
 - a device structure that includes at least one p-type Group III nitride layer that includes some gallium;
 - a first silicon dioxide layer on said p-type layer;
 - a layer of a Group II metal source composition on said first SiO₂ layer; and
 - a second SiO₂ layer on said Group II metal source composition layer.
2. (original) A semiconductor device according to Claim 1 wherein said device structure comprises:
 - a conductive silicon carbide substrate;
 - a conductive buffer layer on said silicon carbide substrate for providing a crystal transition between said substrate and said Group III nitride portions of said device; and
 - an n-type Group III nitride layer on said buffer layer.
3. (original) A device according to Claim 1 wherein said first silicon dioxide layer is thick enough to create vacancies to a depth in said p-type layer that encourages atoms of said Group II metal to diffuse therein while still permitting diffusion from said Group II metal source composition through said first SiO₂ layer and into said p-type layer.
4. (original) A device according to Claim 1 wherein:
 - said first SiO₂ layer is about 1000 Å thick;
 - said Group II metal source composition layer is about 1000 Å thick; and
 - said second SiO₂ layer is about 2500 Å thick.

5. (original) A device according to Claim 1 wherein said Group III nitride comprises GaN and said source composition layer is selected from the group consisting of magnesium and zinc.

6. (cancelled)

7. (previously amended) A device structure according to Claim 2 wherein said substrate is n-type and has a carrier concentration of between about $1 \times 10^{16} \text{ cm}^{-3}$ and about $1 \times 10^{19} \text{ cm}^{-3}$.

8. (original) A device according to Claim 1 wherein said Group II metal source composition layer comprises a Group II metal-containing compound.

9. (original) A device according to Claim 8 wherein said compound is selected from the group consisting of magnesium nitride and zinc phosphide.

10. (previously amended) A device according to Claim 1 wherein said p-type gallium nitride layer has the formula $\text{Ga}_x\text{Al}_y\text{In}_{1-x-y}\text{N}$ where $0 < x \leq 1$ and $0 \leq y \leq 1$.

11. (original) A device according to Claim 1 comprising a plurality of silicon dioxide portions on said p-type Group III nitride layer, with a respective portion of said source composition on each said silicon dioxide portion.

12. (currently amended) ~~A device according to Claim 11~~ An improved p-type gallium nitride-based semiconductor device comprising:

a device structure that includes at least one p-type Group III nitride layer that includes some gallium;

a plurality of silicon dioxide portions on said p-type Group III nitride layer;

a portion of a Group II metal source composition layer on each of said silicon dioxide portions; and

a second silicon dioxide layer on said Group II metal source composition layer,
wherein said second silicon dioxide layer is limited to said source composition layer portions.

13. (original) A device according to Claim 11 wherein said second silicon dioxide portion covers said source composition portions and portions of said p-type Group III nitride layer.

14. (original) An improved p-type gallium nitride-based device comprising:
a conductive silicon carbide substrate;
a conductive buffer layer on said silicon carbide substrate for providing a crystal transition between said substrate and said GaN portions of said device;
an n-type GaN layer on said buffer layer;
a p-type GaN layer on said n-type layer;
a first silicon dioxide layer on said p-type layer;
a magnesium layer on said first SiO₂ layer for supplying p-type dopant to said p-type layer; and
a second SiO₂ layer on said Mg layer for passivating said device;
said first silicon dioxide layer being thick enough to create vacancies to a required depth in said p-GaN layer when said device is heated to temperatures between about 750° and 950° C while still permitting diffusion from the magnesium layer through said first SiO₂ layer and into the p-GaN layer at such temperatures.

15. (original) A device according to Claim 14 wherein said substrate is n-type.

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16. (original) A device according to Claim 14 wherein said buffer is selected from the group consisting of: graded layers of Group III nitrides, homogeneous layers of Group III nitrides, heterogeneous layers of Group III nitrides and combinations thereof.

17. (original) A device according to Claim 14 wherein said n-type layer comprises $\text{Al}_x\text{In}_y\text{Ga}_{1-x-y}\text{N}$ where $0 \leq x \leq 1$ and $0 \leq y \leq 1$

18. (currently amended) A device according to Claim 14 wherein said p-type layer comprises ~~$\text{Ga}_{1-x-y}\text{Al}_x\text{In}_y$~~ $\text{Ga}_x\text{Al}_y\text{In}_{1-x-y}$ N where $0 < x \leq 1$ and $0 \leq y \leq 1$.

19-44. (cancelled)